# Patent Claims

1. A drive train system (1: 1.5);

1.1 having a driving engine (2, 3; 2.5, 3.5);

1.2 having a cooling system (4; 4.5) for cooling the driving engine (2, 3; 2.5, 3.5), which comprises a coolant circuit (5; 5.5), a cooling device (6), and a fan (7; 7.5) that is associated with the cooling device;

1.3 the fan (7; 7.5) is in driveline connection with the driving engine (2, 3; 2.5; 3.5);

characterized by the following feature;

1.5[3] arranged between the driving engine (2, 3; 2.5, 3.5) and the fan (7; 7.5) is a controllable or regulatable clutch (37);

characterized by the following features:

1.6 the clutch (37) takes the form of a hydrodynamic clutch (8; 8.5), comprising a primary wheel and a secondary wheel, which jointly form a working chamber (11) that can be filled with a working fluid;

1.7 having a working fluid supply system (34; 34.5) that is associated with the clutch;

1.8 having means (49) for influencing the transmission behavior of the hydrodynamic clutch (8; 8.5).

2. The drive train system (1; 1.5) according to claim 1, further characterized by the following features:

2.1 having a control and/or regulating device, which comprises at least one control and/or regulating device;

2.2 having registering devices, coupled to the control and/or regulating device, for registering the variables mentioned below:

2.2.1 at least one current operating parameter of the driving engine

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[3] [Translator's Note] "1.4" is missing in the original.

2.2.2 at least one variable that characterizes, at least indirectly, the operating state of the drive train system;

2.2.3 at least one variable that characterizes, at least indirectly, the temperature in the coolant circuit;

2.3 the control and/or regulating device is connected to an adjusting device of the clutch for influencing the transmittable torque.

3. The drive train system according to claim 1 or 2, further characterized by the following features:

3.1 the working fluid supply system (34; 34.5) of the hydrodynamic clutch (8; 8.,5) is formed by the cooling system (4; 4.5);

3.2 the clutch (8; 8.5) is disposed in the flow direction after a circulating pump (14.5) that is arranged in the cooling system (4; 4.5);

3.3 the clutch (8; 8.5) is arranged in a bypass (15) to the coolant circuit (4; 4.5);

3.5[4] having a valve device (24) arranged in the cooling system (4; 4.5) as the adjusting device of the clutch (8; 8.5) for control of the flow of working fluid into the working chamber (11) of the hydrodynamic clutch (8; 8.5).

4. The drive train system according to claim 3, further characterized in that the valve device (24) is arranged in the coolant circuit (4; 4.5).

5. The drive train system according to claim 4, further characterized in that the valve device (24) is arranged in the bypass (15).

6. The drive train system according to one of claims 3 to 5, further characterized in that the valve device (24) takes the form of a proportional valve (25).

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[4] [Translator's Note] "3.4" is missing in the original.

7. The drive train system according to one of claims 3 to 6, further characterized by the following features:

7.1 having a second circulating pump (46) arranged in the cooling circuit (4);

7.2 the second circulating pump (46) is disposed before the first circulating pump (14);

7.3 the second circulating pump (46) is coupled between the driving engine (2, 3) and the clutch (8) by way of a speed/torque converter (47);

7.5[5] the second circulating pump (46) can be adjusted.

8. The drive train system according to claim 7, further characterized in that the adjustability of the second circulating pump (46) occurs by way of a controllable and/or regulatable clutch (45) that is arranged in the driveline connection between the driving engine (2, 3) and the second circulating pump (46).

9. The drive train system according to claim 8, further characterized in that the controllable and/or regulatable clutch (45) takes the form of a hydrodynamic clutch.

10. The drive train system (1; 1.5) according to claim 1 or 2, further characterized by the following features:

10.1 having a separate working fluid supply system (34, 34.5) associated with the clutch (8; 8.5);

10.2 the working fluid supply system (34; 34.5) comprises a circuit (42) that is coupled to the working chamber (11);

10.3 having the means (44) associated with the circuit (42) for changing the filling ratio in the working chamber (11).

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[5] [Translator's Note] "7.4" is missing in the original.

11. The drive train system (1; 1.5) according to claim 10, further characterized in that the circuit (42) is constructed as a closed circuit (42), which is coupled in a pressure-tight manner to a pressure-tight closed working fluid reservoir (36.5) and the means (44) for changing the filling ratio comprise means (43) for applying a static superimposed pressure on the working fluid level in the working fluid reservoir (36.5).

12. A method for optimizing the power supply of a cooling system (4, 4.5) for cooling at least one assembly of a drive train system (1, 1.5), comprising a driving engine, whereby the cooling system (4, 4.5) comprises at least one cooling circuit (5, 5.5), having a cooling device (6) and a fan (7, 7.5) associated with it, whereby the fan (7; 7.5) is in driveline connection with the driving engine (2, 3; 2.5, 3.5).

12.1 in which the cooling capacity of the cooling system (4, 4.5) is controlled and/or regulated by the volume of air that can be supplied by the fan (7; 7.5) for absorbing heat;

12.2 in which the control and/or regulation of the volume of air that can be supplied by the fan (7; 7.5) for absorbing heat occurs through control and/or regulation of the speed (rpm) of the fan (7; 7.5); characterized by the following features:

12.3 in which the control and/or regulation of the speed (rpm) of the fan (7; 7.5) occurs as a function of the variables mentioned below and the change in the temperature in the cooling circuit (5; 5.5) that can be determined from these variables:

12.3.1 at least one current operating parameter of the driving engine (2, 3; 2.5; 3.5)

12.3.2 at least one variable that characterizes, at least indirectly, the operating state of the drive train system (1; 1.5);

12.3.3 at least one variable that characterizes, at least indirectly, the temperature in the cooling circuit (5; 5.5);

12.5[6] in which the torque that is transmittable by way of a clutch (8; 8.5, 37) disposed between the driving engine (2, 3; 2.5, 3.5) and the fan (7; 7.5) or a variable that characterizes said torque at least indirectly functions as a manipulated variable for control and/or regulation of the speed (rpm) of the fan (7; 7.5).

13. The method according to claim 12, further characterized in that, when the drive train system (1; 1.5) is used in a mobile application, the variables that characterize, at least indirectly, the operating state of the drive train system (1; 1.5) are determined by the variables that characterize, at least indirectly, the driving state.

14. The method according to claim 13, further characterized in that the variables mentioned below function as the variables that characterize, at least indirectly, the driving state:

- a variable that characterizes, at least indirectly, the power that can be output by the driving engine
- a variable that characterizes, at least indirectly, the actuation of a braking device or of a selection device for adjusting the driver's intent or of a food pedal.

15. The method according to one of claims 12 to 14, further characterized in that the change in the temperature in the cooling circuit that results is calculated.

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[6] [Translator's Note] "12.4" is missing in the original.

16. The method according to one of claims 12 to 14, further characterized in that the change in the temperature in the cooling circuit that results is estimated in temperature ranges.

17. The method according to one of claims 12 to 16, further characterized in that the control and/or regulation of the speed (rpm) of the fan is a component of a regulation to constant temperature in the coolant circuit.